Walla Walla LT2 Compliance Alternative Selection and Pilot Study

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Today's Presentation

- Background
- LT2 Alternative Selection Process
- Pilot Testing and Data
- Conclusions

City of Walla Walla

- Located in Eastern Washington
- Approx. 32,000 population
- Water Supply from Mill Creek in Oregon and 8 groundwater wells

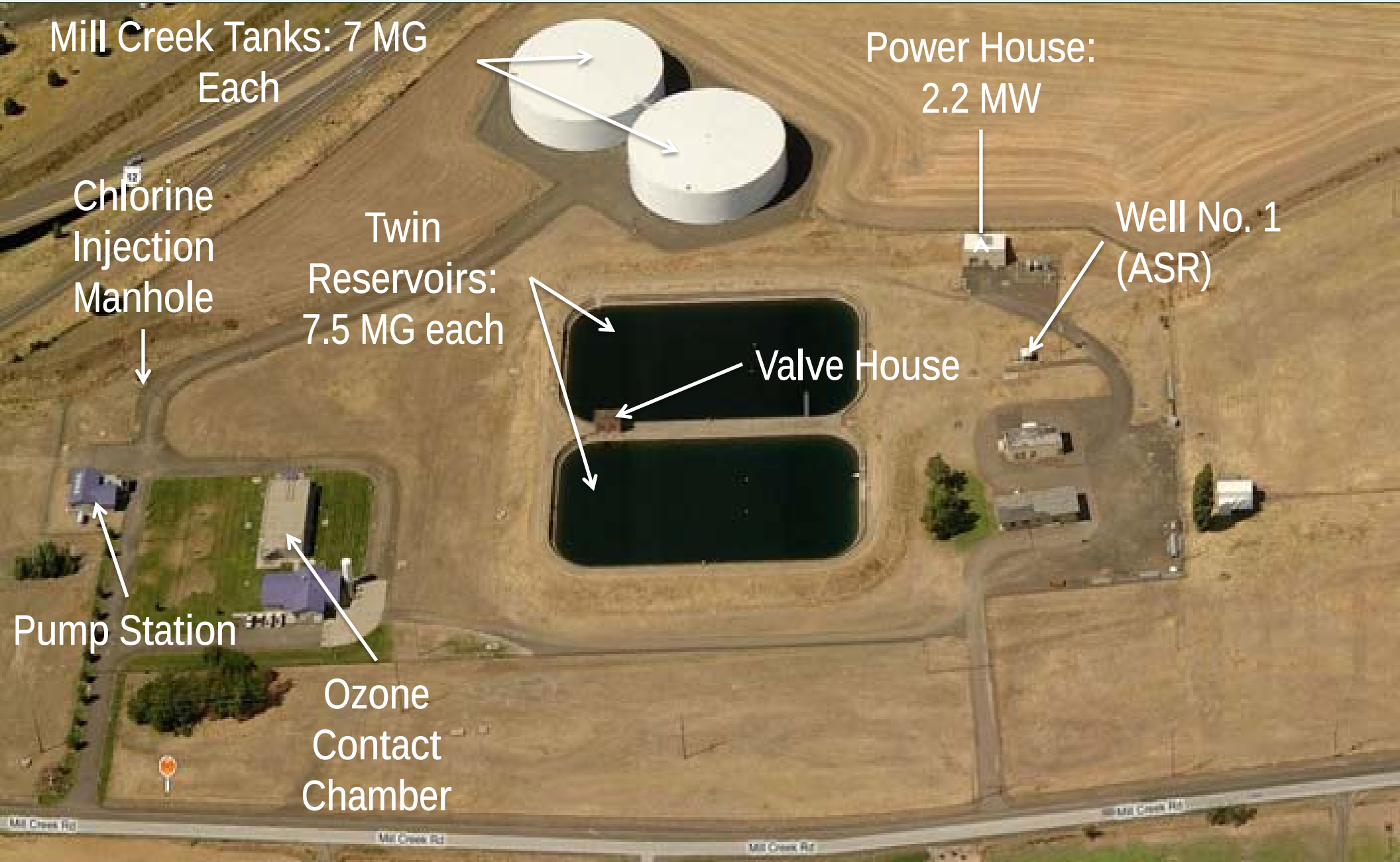
Background

- Plant built in 1922 as a sedimentation-only facility
- Modified over the years
  - Gas chlorination
  - Hydropower
  - Ozonation
- Currently a 24 MGD sedimentation/ ozonation/ chlorination facility

Interesting Features

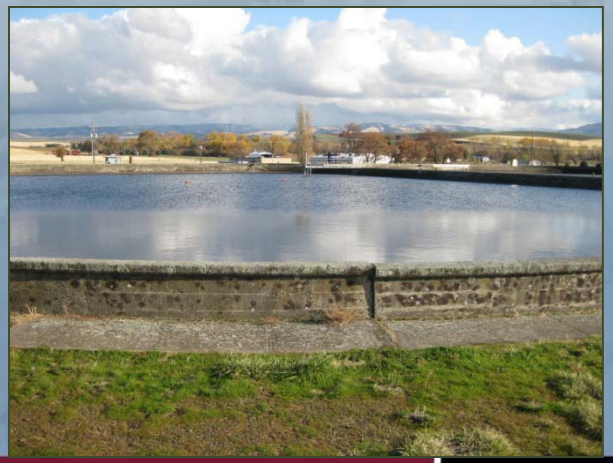
- Raw water pipeline to 2.2 MW Power House
- Aquifer Storage and Recovery

Mill Creek WTP



Long Term 2 Enhanced Surface Water Treatment (LT2) Rule

- Current system of ozonation followed by chlorination
  - Insufficient for *Cryptosporidium* due to cold water temperatures
- Additional treatment required
  - Bin 1 for LT2 treatment



Treatment Alternatives Development

1. Conventional filtration
2. Slow sand filtration
3. Submerged membranes
4. Pressurized membranes
5. Ultraviolet (UV) disinfection

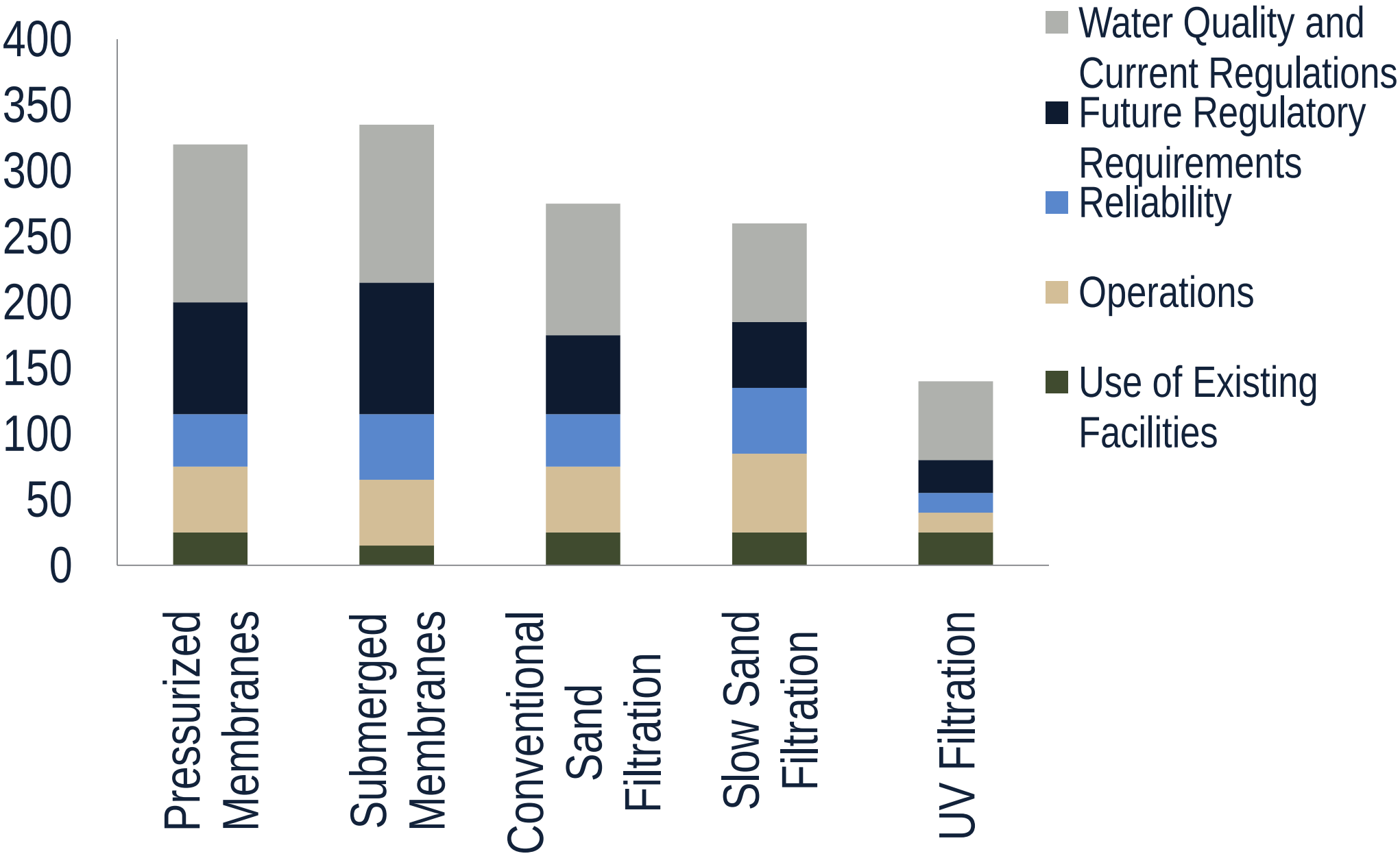
Primary Goals for Developing Alternatives

- Achieve LT2 compliance
- Be compatible with the existing Mill Creek water quality
- Use known and already in use process
- Integrate with the existing Mill Creek WTP with minimal disruption

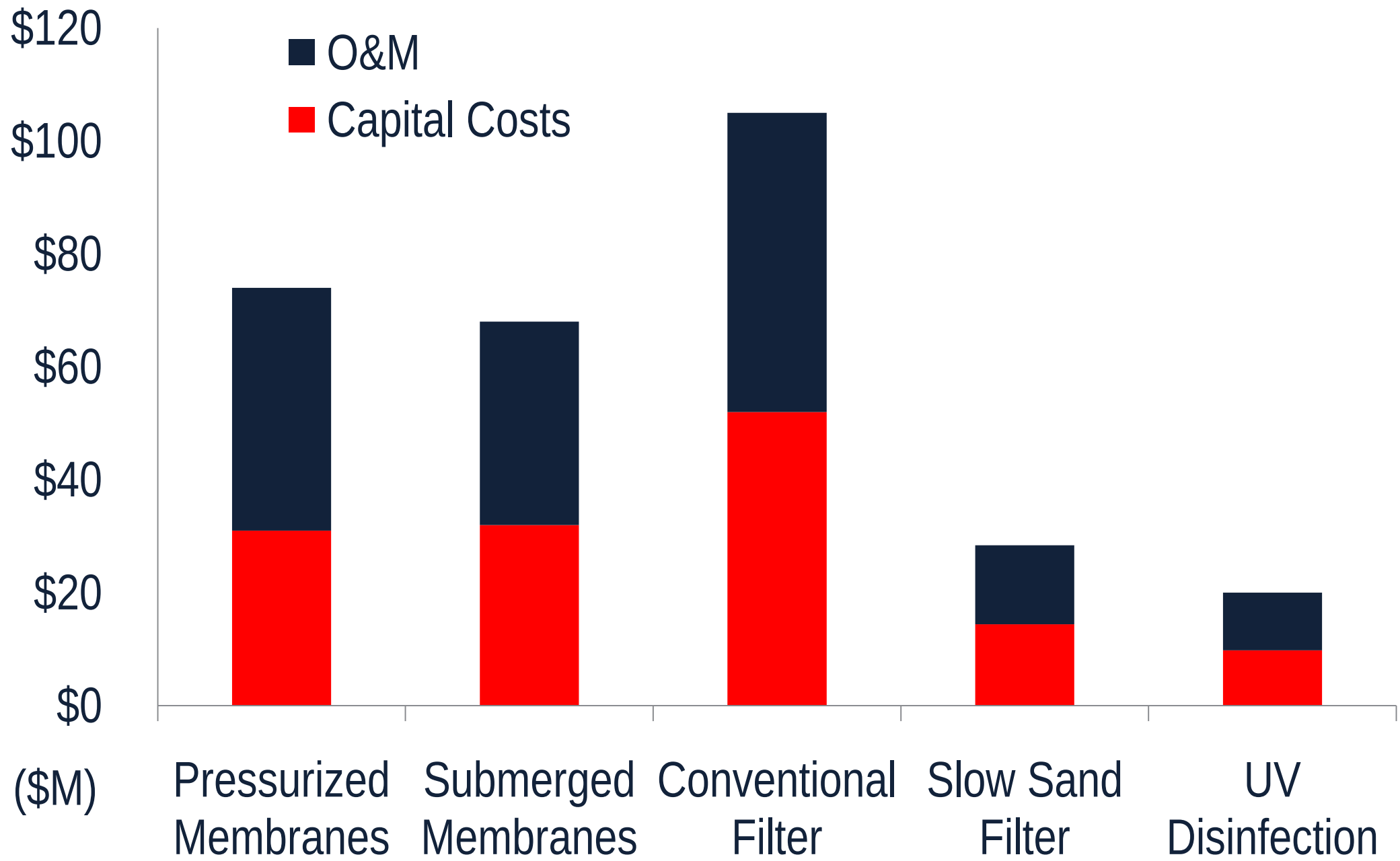
Evaluation Criteria

- Water quality & current regulatory requirements
- Cost and benefit
- Future regulatory requirements
- Reliability & yield
- Operations
- Maximizing the use of existing facilities

Benefits Evaluation



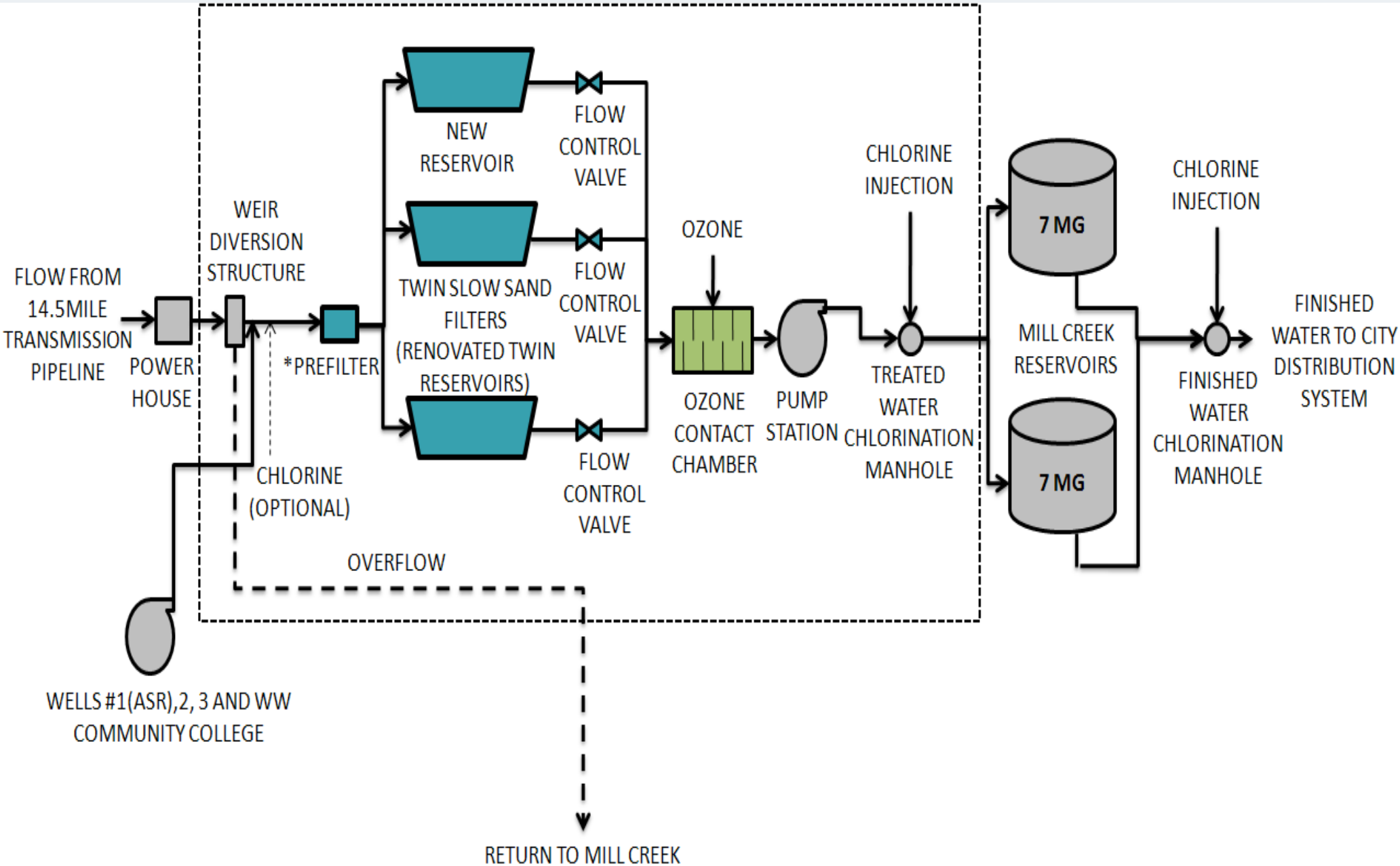
Median 20-Year Net Present Worth Costs



Slow Sand Filtration Selection

- High benefits to the City
  - No additional chemicals
  - No additional pumping
  - Reuse of existing sedimentation basins and ozone
  - Simple operations
  - Maintains hydropower generation
- Provided low cost 20-year lifecycle cost
  - Second lowest capital cost
  - Overall lowest O&M cost

Slow Sand Process Flow Diagram



Mill Creek WTP

Pilot Testing Goals

- Feasibility
- Operating parameters
- Worst case scenario
- Test four filters
  1. Richland sand with roughing filter
  2. Richland sand without roughing filter
  3. Walla Walla WWTP sand
  4. Lane Mountain LM#20/30 Sand
- March 2011
  - Second roughing filter added

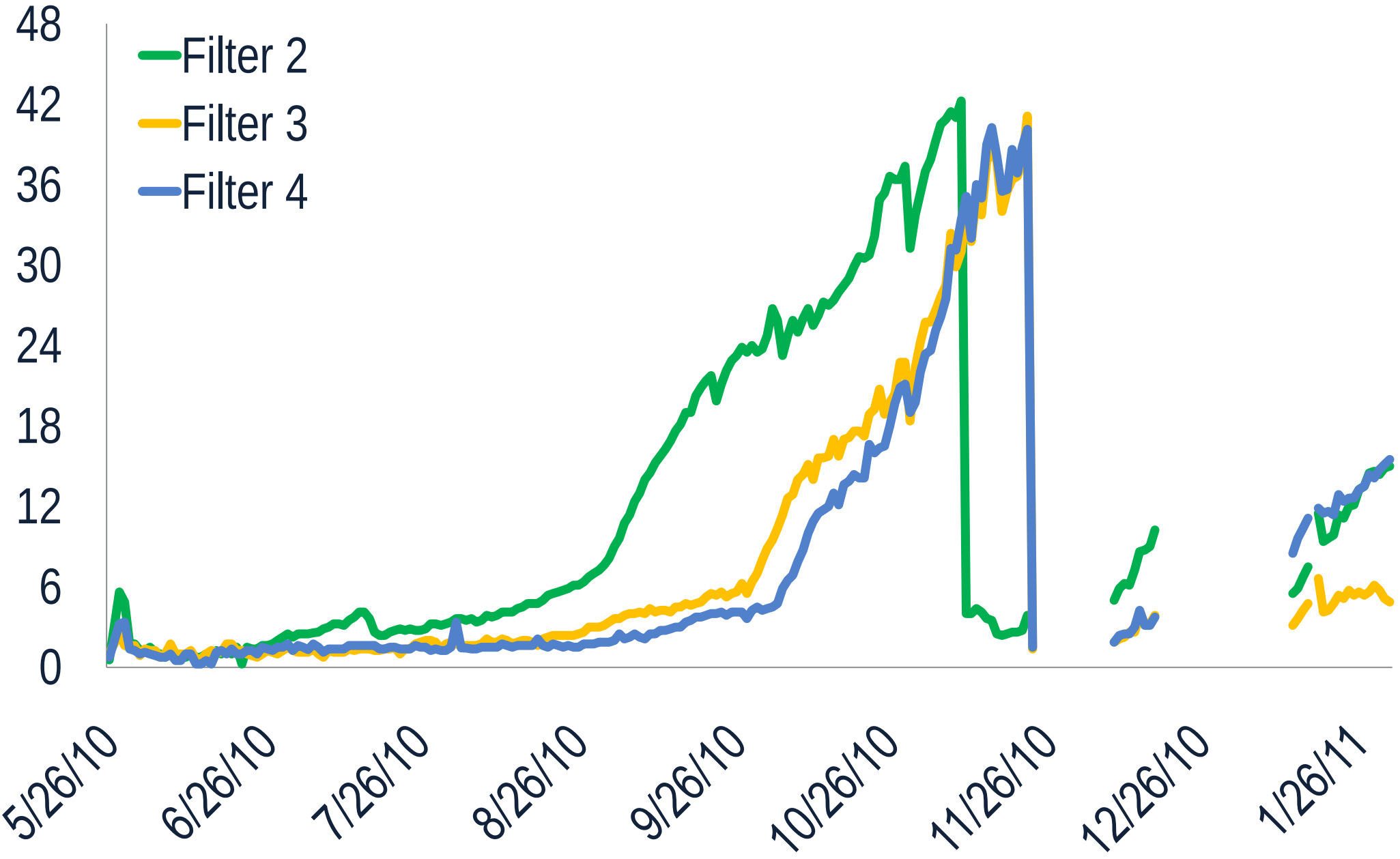
Testing Protocol

- Environmental conditions
- 48-inch diameter polyethylene tanks (6 ft. tall)
- WSDOH Guidelines
  - 0.1 gpm / ft^2 loading rate
  - Roughing Filters
    - 5 gpm / ft^2 loading (R1)
    - 1 gpm / ft^2 loading (R2)

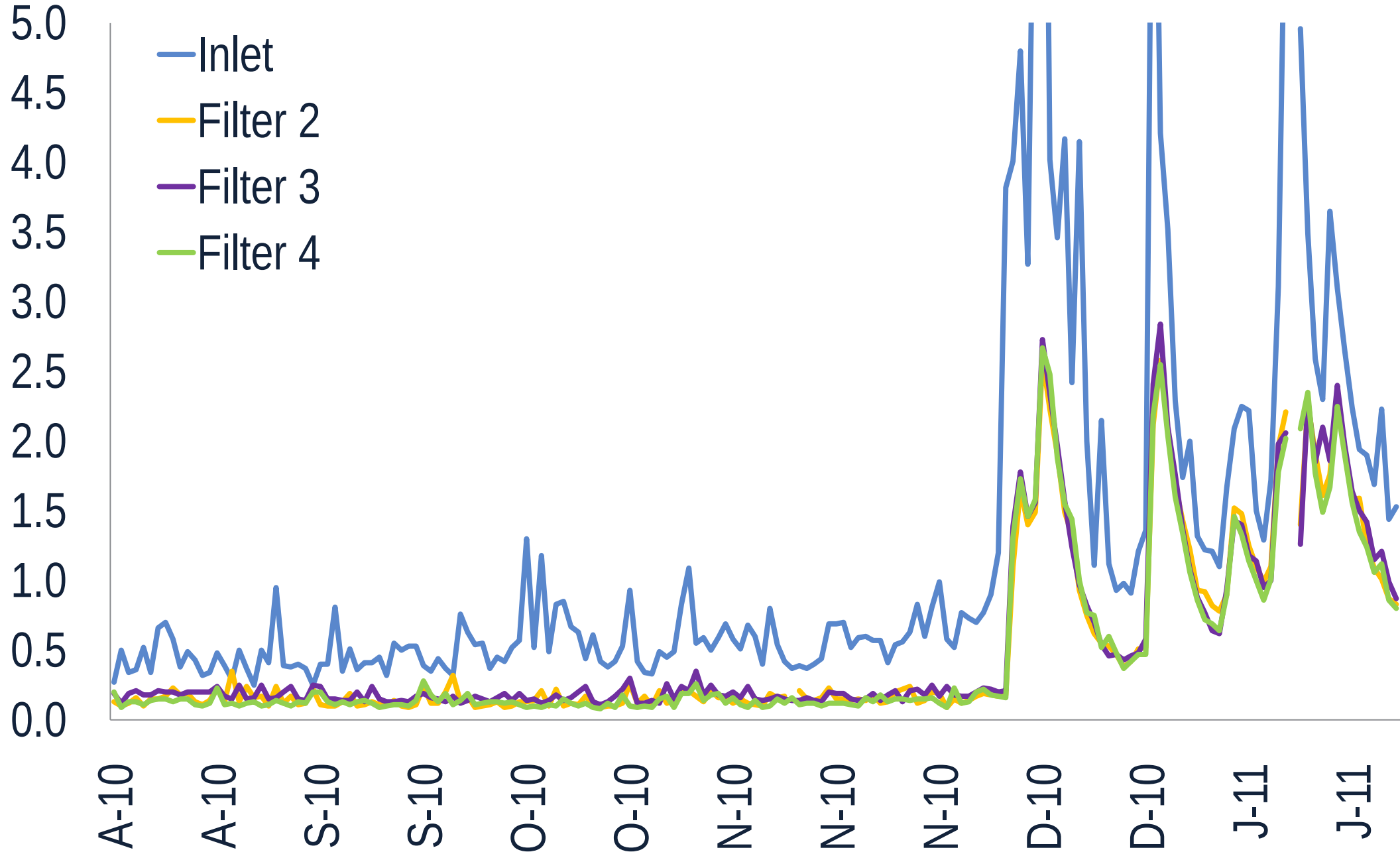
Pilot Study

- Started May 26, 2010
- First filter scrapings in November 2010
- Pilot through design
- Currently in Month 11 of testing

Headloss (No Roughing Filter)



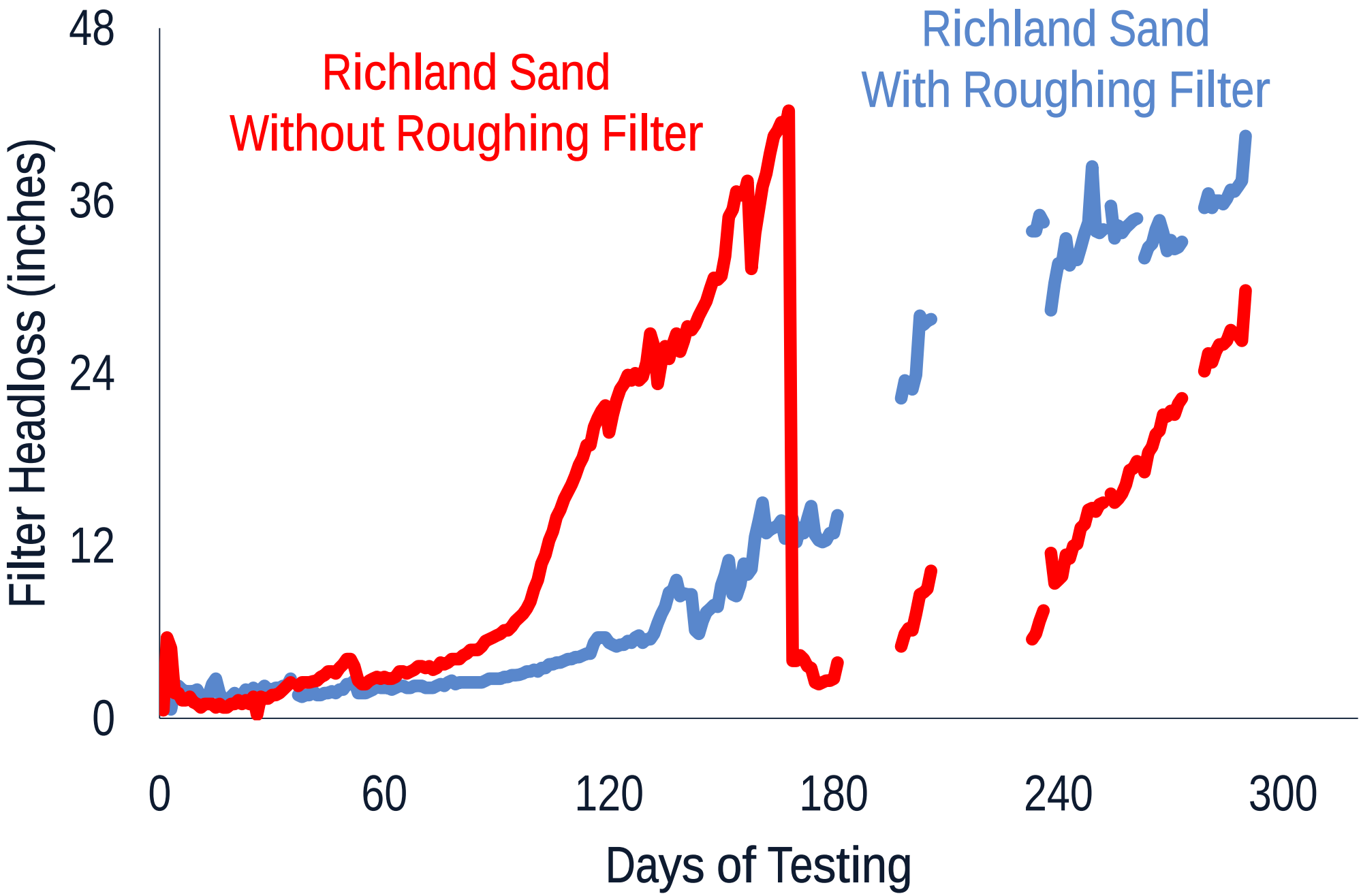
Turbidity During Winter Storms



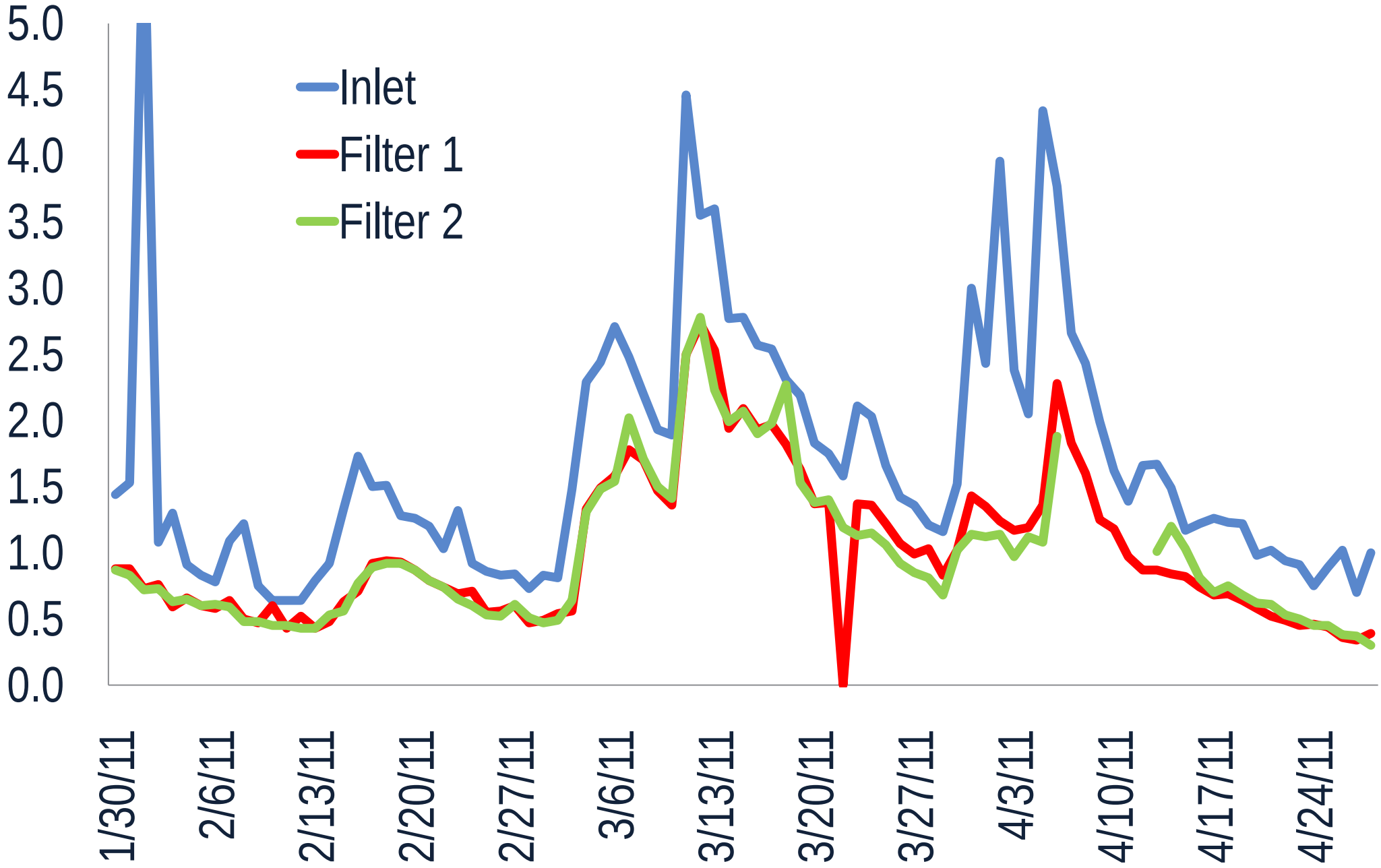
Roughing Filters

- Best performance from Filter 1 (R1+ Richland)
  - Scraped in March 2011
  - 5 gpm/SF
- Filter 2 (R2 + Richland)
  - Comparison to R1
  - 1 gpm/SF

Headloss with and without Roughing Filter



Turbidity – Comparing Roughing Filters



Project Summary

- Mill Creek WTP will be upgraded to 24 MGD slow sand filtration
- Best process due to chemical and energy considerations
- Pilot testing is ongoing
- Predesign to commence soon

Thank you!

- City of Walla Walla
  - Frank Nicholson, PE (Project Manager)
  - Tom Krebs (WTP Manager)
  - Curt Skifstad, Operator
  - Mike Neher, Operator
- HDR Engineering
  - Aaron Meilleur, PE
  - Pierre Kwan, PE

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